

CT-PPS Quartic Geant4 simulation tool

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

| | |
|---|----|
| G4SteppingVerbose | |
| QuartLSteppingVerbose | 10 |
| G4UImessenger | |
| QuartLPrimaryGeneratorMessenger | 8 |
| G4UserEventAction | |
| QuartLEventAction | 7 |
| G4UserRunAction | |
| QuartLRunAction | 8 |
| G4UserStackingAction | |
| QuartLStackingAction | 9 |
| G4VSensitiveDetector | |
| DetectorSD | 5 |
| G4VUserActionInitialization | |
| QuartLActionInitialization | 5 |
| G4VUserDetectorConstruction | |
| QuartLDetectorConstruction | 6 |
| G4VUserPrimaryGeneratorAction | |
| QuartLPrimaryGeneratorAction | 7 |
| QuartLAnalyzer | 6 |
| TObject | |
| QuartLRunInfo | 9 |

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

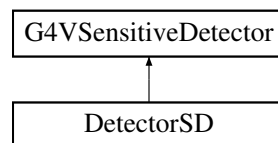
| | |
|---|----|
| DetectorSD | 5 |
| QuartLActionInitialization | 5 |
| QuartLAnalyzer | 6 |
| QuartLDetectorConstruction | 6 |
| QuartLEventAction | 7 |
| QuartLPrimaryGeneratorAction | 7 |
| QuartLPrimaryGeneratorMessenger | 8 |
| QuartLRunAction | 8 |
| QuartLRunInfo | 9 |
| QuartLStackingAction | 9 |
| QuartLSteppingVerbose | 10 |

Chapter 3

Class Documentation

3.1 DetectorSD Class Reference

Inheritance diagram for DetectorSD:



Public Member Functions

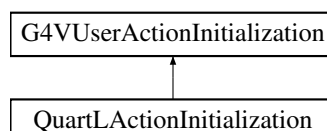
- **DetectorSD** (G4String)
- void **Initialize** (G4HCofThisEvent *)
- G4bool **ProcessHits** (G4Step *, G4TouchableHistory *)
- void **EndOfEvent** (G4HCofThisEvent *)

The documentation for this class was generated from the following file:

- include/DetectorSD.hh

3.2 QuartLActionInitialization Class Reference

Inheritance diagram for QuartLActionInitialization:



Public Member Functions

- virtual void **BuildForMaster** () const
- virtual void **Build** () const

The documentation for this class was generated from the following file:

- include/QuartLActionInitialization.hh

3.3 QuartLAnalyzer Class Reference

```
#include <QuartLAnalyzer.hh>
```

Public Member Functions

- [QuartLAnalyzer](#) (G4String filename="events.root")
Default class constructor to book the TTree and its different leaves to store the information.
- void [AddHitInEvent](#) (G4Step *step)
Add a new photon hit on the PMT in the events' collection.
- void [FillTree](#) ()
Fills all branches in the TTree for one given event.
- void [Store](#) ()
Store the TTree onto an external ROOT file.
- G4int [GetNumHitsInEvent](#) () const

3.3.1 Detailed Description

Analysis class intended to store into a TTree the photons kinematic information for each event.

3.3.2 Constructor & Destructor Documentation

3.3.2.1 QuartLAnalyzer::QuartLAnalyzer (G4String *filename* = "events.root")

Default class constructor to book the TTree and its different leaves to store the information.

Parameters

| | | |
|----|-----------------|---|
| in | <i>filename</i> | The file name to store the output tree. |
|----|-----------------|---|

3.3.3 Member Function Documentation

3.3.3.1 void QuartLAnalyzer::AddHitInEvent (G4Step * *step*)

Add a new photon hit on the PMT in the events' collection.

Parameters

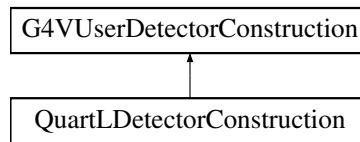
| | | |
|----|-------------|--|
| in | <i>step</i> | The Geant4 iterative step from which the photon kinematics is extracted. |
|----|-------------|--|

The documentation for this class was generated from the following file:

- include/QuartLAnalyzer.hh

3.4 QuartLDetectorConstruction Class Reference

Inheritance diagram for QuartLDetectorConstruction:



Public Member Functions

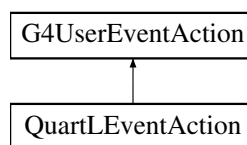
- G4VPhysicalVolume * **Construct** ()
- G4ThreeVector **GetCellCenter** (G4int station_id, G4int cell_id) const

The documentation for this class was generated from the following file:

- include/QuartLEventAction.hh

3.5 QuartLEventAction Class Reference

Inheritance diagram for QuartLEventAction:



Public Member Functions

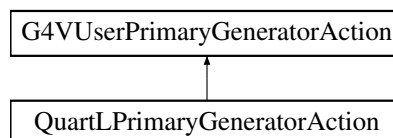
- void **BeginOfEventAction** (const G4Event *)
- void **EndOfEventAction** (const G4Event *)

The documentation for this class was generated from the following file:

- include/QuartLEventAction.hh

3.6 QuartLPrimaryGeneratorAction Class Reference

Inheritance diagram for QuartLPrimaryGeneratorAction:



Public Member Functions

- void **GeneratePrimaries** (G4Event *)
- void **SetOptPhotonPolar** ()
- void **SetOptPhotonPolar** (G4double)
- G4bool **SetInputROOTFile** (G4String)
- G4bool **ProbeOneCell** (G4int, G4int, G4double)

3.6.1 Member Function Documentation

3.6.1.1 G4bool QuartLPrimaryGeneratorAction::SetInputROOTFile (G4String)

Sets the input ROOT file from which all simulated events are to be fetched in private attributes.

Parameters

| | | |
|-----------|-----------------|---------------------------------------|
| <i>in</i> | <i>filename</i> | The ROOT file to open to fetch events |
|-----------|-----------------|---------------------------------------|

Returns

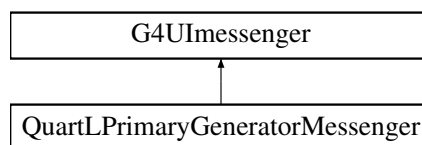
A boolean stating the success or failure of the TTree retrieval

The documentation for this class was generated from the following file:

- include/QuartLPrimaryGeneratorAction.hh

3.7 QuartLPrimaryGeneratorMessenger Class Reference

Inheritance diagram for QuartLPrimaryGeneratorMessenger:



Public Member Functions

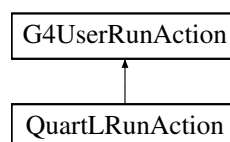
- **QuartLPrimaryGeneratorMessenger** ([QuartLPrimaryGeneratorAction](#) *)
- void **SetNewValue** (G4Uicommand *, G4String)

The documentation for this class was generated from the following file:

- include/QuartLPrimaryGeneratorMessenger.hh

3.8 QuartLRunAction Class Reference

Inheritance diagram for QuartLRunAction:



Public Member Functions

- **QuartLRunAction** ([QuartLAnalyzer](#) *analyzer=0)
- void **BeginOfRunAction** (const G4Run *aRun)
- void **EndOfRunAction** (const G4Run *aRun)

- [QuartLAnalyzer](#) * [GetAnalyzer](#) ()

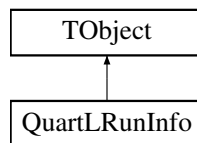
Returns a pointer to the [QuartLAnalyzer](#) object used to collect all tracks' information in an external ROOT tree.

The documentation for this class was generated from the following file:

- include/QuartLRunAction.hh

3.9 QuartLRunInfo Class Reference

Inheritance diagram for QuartLRunInfo:



Public Member Functions

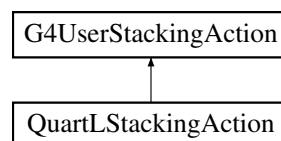
- int **GetRunId** () const
- double **GetProtonEnergy** () const

The documentation for this class was generated from the following file:

- include/QuartLRunInfo.hh

3.10 QuartLStackingAction Class Reference

Inheritance diagram for QuartLStackingAction:



Public Member Functions

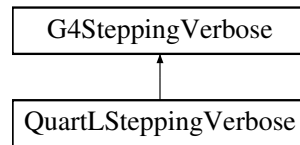
- G4ClassificationOfNewTrack [ClassifyNewTrack](#) (const G4Track *aTrack)
Method to be run on every new track in the iterative tracking.
- void **NewStage** ()
- void **PrepareNewEvent** ()

The documentation for this class was generated from the following file:

- include/QuartLStackingAction.hh

3.11 QuartLSteppingVerbose Class Reference

Inheritance diagram for QuartLSteppingVerbose:



Public Member Functions

- void **StepInfo** ()
- void **TrackingStarted** ()

The documentation for this class was generated from the following file:

- include/QuartLSteppingVerbose.hh